TABLE 1.—*Mean free-air barometric pressure in millibars, temperature in degrees centigrade, and relative humidities in percent obtained by radiosondes.*—Continued

MONTHS AND ELEVATIONS IN METERS ABOVE SEA LEVEL—Continued

Altitude (meters) m. s. l.	November 1941 (10 m.)				December 1941 (10 m.)				January 1942 (10 m.)				February 1942 (10 m.)				March 1942 (10 m.)				April 1942 (10 m.)				May 1942 (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	1,012	26.2	80	31	1,013	26.0	84	31	1,015	24.8	79	28	1,012	24.5	81	31	1,012	25.6	79	23	1,013	25.8	77	31	1,011	26.3	84
500	30	958	23.3	83	31	957	23.1	87	31	960	21.9	82	28	957	21.9	83	31	958	22.2	84	23	957	22.6	83	31	956	23.1	89
1,000	30	904	20.3	79	31	904	20.2	84	31	906	18.5	83	28	904	18.9	79	31	904	19.2	78	23	904	19.3	81	31	903	20.1	84
1,500	30	853	17.6	75	31	853	17.4	81	31	855	15.5	81	28	852	16.5	73	31	853	17.0	68	23	853	16.6	76	31	852	17.3	79
2,000	30	804	14.8	74	31	804	15.0	76	31	805	13.1	73	28	803	14.5	60	31	804	15.0	57	23	804	14.7	63	31	803	14.7	75
2,500	30	758	12.3	70	31	758	12.8	69	31	759	11.0	64	28	757	12.5	51	31	758	12.8	50	23	757	12.7	52	31	757	12.0	72
3,000	30	714	10.3	60	31	714	10.4	62	31	714	8.9	55	28	713	10.5	46	31	714	10.4	44	23	713	10.5	46	31	712	9.4	67
4,000	30	633	5.6	53	30	633	5.8	47	31	633	4.2	46	28	632	5.7	37	29	632	6.1	36	21	632	5.4	42	31	631	4.1	64
5,000	30	560	0.6	48	29	560	0.5	41	30	559	−0.6	38	28	559	0.4	28	29	559	0.8	31	21	559	0.4	41	31	558	−0.7	62
6,000	29	494	−5.0	45	28	494	−5.3	39	30	493	−7.0	32	28	493	−5.7	24	29	493	−5.6	28	19	493	−5.1	41	31	492	−6.0	54
7,000	29	434	−11.4	43	28	434	−11.6	38	29	433	−13.7	24	27	433	−12.4	22	29	434	−12.3	27	18	434	−11.9	36	31	432	−12.3	48
8,000	29	380	−17.7	41	28	380	−18.0	37	29	379	−19.8	20	26	379	−18.8	21	29	380	−19.1	26	18	380	−18.4	33	31	378	−19.3	46
9,000	29	331	−24.4	39	28	332	−25.3	37	28	330	−27.3	19	26	330	−26.4	20	27	331	−26.1	25	18	331	−25.8	32	31	330	−26.0	43
10,000	29	289	−31.3	38	27	289	−32.5	36	28	287	−34.4	18	25	288	−34.1	20	27	288	−33.2	25	18	288	−33.1	32	31	287	−33.4	----
11,000	28	250	−38.9	----	26	250	−39.8	----	28	248	−42.0	----	25	249	−41.2	----	27	249	−40.6	----	17	250	−40.6	----	31	248	−41.4	----
12,000	28	216	−46.1	----	26	215	−46.9	----	27	214	−49.0	----	25	214	−47.5	----	27	215	−47.9	----	17	216	−48.5	----	31	214	−49.0	----
13,000	27	185	−53.4	----	25	185	−53.7	----	27	183	−56.1	----	25	184	−53.9	----	27	184	−55.6	----	15	185	−55.8	----	31	183	−57.6	----
14,000	26	158	−60.4	----	25	158	−60.2	----	27	156	−62.1	----	25	157	−61.0	----	27	157	−63.3	----	14	158	−63.2	----	30	156	−66.0	----
15,000	26	135	−67.0	----	25	134	−65.9	----	25	133	−67.3	----	24	133	−68.6	----	26	133	−70.6	----	14	133	−70.3	----	30	132	−73.9	----
16,000	26	114	−72.1	----	24	114	−70.4	----	24	112	−72.4	----	24	112	−75.6	----	24	113	−76.5	----	13	112	−76.8	----	----	----	----	----
17,000	22	96	−75.6	----	18	96	−73.7	----	20	94	−77.0	----	23	94	−80.2	----	22	94	−81.4	----	12	94	−80.1	----	----	----	----	----
18,000	17	80	−77.4	----	17	81	−76.3	----	18	79	−79.7	----	18	79	−83.5	----	15	79	−82.5	----	8	80	−82.6	----	----	----	----	----
19,000	8	68	−77.8	----	7	68	−77.9	----	----	----	----	----	15	66	−82.9	----	9	66	−80.4	----	6	66	−80.7	----	----	----	----	----

Altitude (meters) m. s. l.	June, 1942 (10 m.)				July, 1942 (10 m.)				August, 1942 (10 m.)				September, 1942 (10 m.)				October 1942 (10 m.)				November 1942 (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	30	1011	27.2	85	30	1014	27.0	85	28	1012	26.8	86	27	1011	26.7	86	21	1012	26.4	85	30	1011	25.8	80
500	30	957	23.9	88	30	959	23.2	89	28	957	22.9	90	27	956	23.3	90	21	957	23.5	87	30	956	22.4	85
1,000	30	904	21.0	82	30	906	20.1	85	28	904	19.9	86	27	903	20.5	85	21	904	20.6	84	30	903	19.1	86
1,500	30	853	18.4	77	30	855	17.5	77	28	853	16.9	81	27	853	17.7	80	21	853	17.5	84	30	852	16.6	81
2,000	30	804	15.9	72	30	806	14.7	71	28	804	14.1	77	27	804	15.0	77	21	804	14.6	83	30	803	14.0	77
2,500	30	858	13.5	66	30	759	12.3	65	28	758	11.7	73	27	758	12.6	71	21	758	12.1	79	30	757	11.8	71
3,000	30	714	10.9	61	30	716	9.6	60	28	714	9.0	70	27	714	9.9	69	21	714	9.8	71	30	713	9.8	61
4,000	28	633	4.9	62	30	634	4.0	57	26	632	3.5	67	26	632	4.6	68	21	632	5.1	56	30	632	4.8	52
5,000	28	559	−1.1	64	29	560	−1.6	57	26	559	−2.3	67	26	559	−0.8	70	21	559	−0.1	45	30	558	−0.6	49
6,000	28	493	−7.0	59	28	493	−7.7	56	26	492	−8.3	68	26	492	−6.5	71	21	493	−5.8	39	29	492	−6.3	43
7,000	27	433	−13.1	56	26	433	−14.1	55	26	432	−14.3	67	26	433	−12.4	67	21	433	−12.2	35	29	432	−13.0	40
8,000	27	379	−19.1	54	23	378	−20.2	53	26	377	−20.5	64	26	378	−19.4	66	21	378	−19.5	33	28	378	−20.0	39
9,000	27	330	−26.0	53	23	330	−27.1	52	26	329	−27.8	61	26	329	−26.4	65	21	330	−27.1	32	27	329	−27.2	39
10,000	27	287	−33.9	----	23	287	−34.7	----	25	286	−35.7	60	25	286	−34.0	62	21	287	−34.3	31	27	286	−34.7	38
11,000	27	248	−41.9	----	22	248	−42.5	----	24	247	−43.6	----	24	247	−42.2	----	21	248	−42.0	----	27	247	−42.4	----
12,000	27	214	−50.4	----	20	213	−50.8	----	23	212	−52.0	----	24	213	−50.7	----	18	214	−49.9	----	27	213	−50.4	----
13,000	27	183	−59.7	----	18	183	−58.7	----	21	181	−60.4	----	24	182	−59.8	----	18	183	−58.7	----	25	182	−58.5	----

Altitude (meters) m. s. l.	Year 1941 (10 m.)				Year 1942 (10 m.)				Altitude (meters) m. s. l.	Year 1941 (10 m.)				Year 1942 (10 m.)			
	Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity		Number of observations	Pressure	Temperature	Relative humidity	Number of observations	Pressure	Temperature	Relative humidity
Surface	364	1,012	26.2	82	340	1,012	26.0	83	9,000	345	331	−25.6	38	305	330	−26.8	41
500	364	957	23.0	86	340	957	22.8	86	10,000	342	288	−32.7	37	301	287	−34.3	----
1,000	364	904	20.2	81	340	904	19.7	83	11,000	335	249	−40.3	----	297	248	−42.0	----
1,500	364	853	17.5	75	340	853	17.0	78	12,000	331	215	−47.6	----	290	214	−49.8	----
2,000	364	804	15.1	69	340	804	14.5	72	13,000	327	184	−54.9	----	281	183	−57.8	----
2,500	364	758	12.9	62	339	758	12.2	65	14,000	320	157	−61.9	----	----	----	----	----
3,000	364	714	10.5	56	338	714	9.8	59	15,000	314	134	−67.9	----	----	----	----	----
4,000	360	633	5.4	49	329	632	4.6	54	16,000	307	113	−72.3	----	----	----	----	----
5,000	357	560	−0.2	45	326	559	−0.7	51	17,000	280	95	−74.1	----	----	----	----	----
6,000	352	493	−6.1	43	322	493	−6.6	48	18,000	246	80	−72.7	----	----	----	----	----
7,000	350	434	−12.5	41	316	433	−13.0	44	19,000	180	68	−69.7	----	----	----	----	----
8,000	348	379	−18.7	39	310	378	−19.7	42	20,000	109	58	−64.6	----	----	----	----	----

RIVER STAGES AND FLOODS

By C. R. JORDAN

Precipitation averaged above normal during February over most of the eastern half of the country except Florida, New England, and the Lakes region. It was particularly heavy in northeastern Texas, Oklahoma, and northwestern Missouri. Rainfall also averaged above normal in the far West.

There was some light overflow in Pennsylvania, New York, and New England that resulted from the melting of snow or from backwater from ice jams that accompanied the Spring break-ups. Moderately severe flooding occurred in the Central States from the Gulf of Mexico to North Dakota, and flooding was reported in California, Nevada, and Oregon.

Snow and ice conditions at the end of February had improved considerably in Pennsylvania and western and southern New York and to some extent in southern New England. A heavy snow cover was still present in Maine and in the headwater areas of the Merrimack, Connecticut, Hudson, Delaware, and Susquehanna Rivers.

A brief summary of the conditions as they existed at the end of February in individual basins is given below. The surveys of snow depth and water content represent the joint efforts of many cooperating agencies, public and private.

Rivers in Maine.—Snow depths in the headwaters of the larger Maine Rivers decreased slightly during the last week of February, but most of the snow melt did not run off, but settled to the base of the cover, so the water content of the snow has actually increased by a small amount.

In the central and southern parts of the State, snow cover and water content of the snow have both decreased considerably. This lessens the flood threat by giving promise of free passage in the lower reaches of the rivers for the potential overflow from the headwaters.

Merrimack Basin.—Water content of the snow has substantially increased. The storms of February 22 and 26 produced precipitation mostly in the form of rain. Moderate rises in temperature attended the rain in the lower basin, and resulted in a considerable melting of snow in that area. However, as maximum temperatures in the area above Manchester remained in the lower 40's and upper 30's, there was a negligible increase in run-off from the previous week over that portion as the rainfall was largely absorbed by the snow.

A snow survey near the end of the month showed an average water content of 7.6 inches in the area above Concord. Weighted for elevation, the value would be slightly higher. This compares with an average water content of 5.3 inches from a survey made earlier in the month.

Ice thickness decreased somewhat, and open spaces were increasing in number in the lower and middle reaches; little change was noted in the upper reaches.

Connecticut River.—The weather had some effect during the last week of February in slowly changing the snow cover in the northern and central portions of the Connecticut River Basin to a greater density and, some run-off was evident from this area. A more satisfactory condition with respect to relief from flood potentialities progressed in the south portion, particularly in Connecticut, where prolonged thawing temperatures and rain during February 21 to 27 melted away at least one-third of the snow and ice on the ground. In Massachusetts and Connecticut the river ice softened and eroded and showed further signs of going out easily with the steady rise of tributaries and the main river.

The Connecticut River and tributaries were beginning to rise as the month closed as may be expected at this season. However, stages were still very low and it would take a considerable amount of rainfall, together with prolonged temperatures above 40°, to melt the snow fast enough to produce sufficient run-off to exceed the storage capacity of the river channels. Nevertheless, considering the inches of water content in the snow, it must be concluded from similar conditions of past years, that the flood potentialities continue critical.

Hudson River.—A combination of favorable weather sequences reduced the flood threat in the Hudson and Mohawk Rivers. The ice continued to deteriorate in practically all sections except the most northern. Snow depths ranged from less than 5 inches in the lower Hudson Valley to 35 inches in the upper Sacandaga. Water content ranged from 1 to 3 inches in the lower Hudson and from 6 to 10 inches in the Sacandaga Basin. Water content in the Mohawk and upper Hudson River was only slightly less than in the Sacandaga.

Delaware River.—Temperatures remained well above normal during the latter part of February, while moderate to heavy rains were reported on the 26th. These conditions melted the entire snow cover in the Schuylkill Basin and the Delaware Basin below Belvidere, including the lower reaches of the Lehigh.

In the upper reaches of the Delaware and Lehigh Basins, including the Lackawaxen, the snow cover was reduced about 50 percent with the water content of the present cover from 30 to 40 percent less than earlier in February. The Schuylkill was free of ice and none was reported on the Delaware below Port Jervis except locally near Dingman's Ferry. Ice was breaking up on the Lackawaxen and a small foot bridge at Hawley was carried out by a jam during the night of the 27–28th.

Susquehanna River.—During the latter part of February weather conditions were favorable for snow melting and easy run-off from the watershed above Towanda. The average snow depth on the watershed settled and was reduced to 9.1 inches but with an estimated water content of 5.32 inches or an abnormal density of 58 percent. Many ice gorges in the river courses were broken up and carried downstream thus greatly relieving the ice-pack menace but considerable ice remains in the up-river areas to go out later.

In the Susquehanna below Towanda much of the snow was removed and conditions are very favorable in the Juniata and West Branch areas and on the North Branch they are improved as only a normal snow cover now exists. Moderate rises in stages occurred in all streams, but were well below flood levels except for backwater from ice jams in the West Branch in vicinity of Renovo and in the lower Susquehanna below Harrisburg. Most of the ice was removed except in northern creeks and in the basin above Towanda.

Ohio River Basin above Pittsburgh.—With the exception of a relatively small area in the extreme upper portion of the Allegheny Basin, the snow on the ground at the end of February was of little importance.

Mild weather continued most of the time during March over the Northeastern States without the occurrence of any heavy rain producing storms and the snow cover was gradually depleted except in the higher elevations of New England. The run-off was accommodated by the streams without any serious overflow.

Atlantic Slope Drainage.—There was some light overflow at scattered points in New York and Pennsylvania that resulted mostly from backwater when ice gorges formed in numerous streams. Overflow was mostly local and damage was not extensive.

Moderately heavy rainfall on February 12–13 produced slightly above flood stages on the Cape Fear, Neuse, Tar, and Roanoke Rivers in eastern North Carolina. The heavy flow was maintained through the month and into early March in the lower Neuse River and in the Roanoke River in the Williamston area. Only light damage was reported.

Light flooding occurred at scattered points during the month on the Pee Dee, Broad, Ocmulgee, and Altamaha Rivers but no damage was reported.

East Gulf of Mexico Drainage.—Rainfall was frequent over the eastern Gulf States during the latter half of February. Light flooding occurred at a few points along the Apalachicola, Coosa, Cahaba, and Alabama Rivers and wide overflow was in progress at the end of the month along the Black Warrior, Tombigbee, and Pearl Rivers.

There were three distinct rises in the Black Warrior River from February 13 to March 6. Heavy rainfall over the Warrior watershed on February 12–13, averaged 3.25 inches and caused a 24-hour rise at Tuscaloosa of 30.5 feet. The river crested at 56.2 feet on February 14, 9.2 feet above flood stage. On February 21–22, additional rainfall averaged about 1.50 inches over the watershed and a second crest of 46.0 feet, one foot below flood stage, was reached early on the 23rd. A third crest of 52.7 feet at Tuscaloosa was reached on March 6th, following the rainfall of March 3–4, that averaged 2.80 inches over the basin.

Beginning on February 19, rain fell every day for three

days over the entire Tombigbee River Basin, averaging 4.30 inches north of Demopolis, Ala., and 2.30 inches south of Demopolis. The heaviest rainfall reported was at Macon, Miss., where a total of 7.20 inches was recorded. The upper Tombigbee crested at Aberdeen, Miss., 4 feet above flood stage on Feb. 23 and receded to below flood stage by March 3 when additional rainfall that averaged 3 inches over the upper basin on March 3–4 started the upper Tombigbee to rising again. The lower Tombigbee was at a fairly high stage that resulted from rains early in February and the additional rain that began falling near the middle of the month swelled the stream quickly past flood stage and maintained high stages well into March. Considerable damage resulted from this overflow but damage reports have not yet been collected.

Light to moderate flooding was also in progress along the Pearl River in Mississippi that began about the middle of February and continued into March.

Upper Mississippi and Missouri Basin.—Flood stage was reached on the Des Moines River at Eddyville, Iowa, on Feb. 15 and again on the 18th through the 21st. These stages resulted from an ice gorge that formed below Eddyville and caused backwater. There was no damage as the overflow covered only low farm land. Ice action also caused light local flooding at Augusta, Iowa, on the Skunk River from Feb. 16–19. There was also some light overflow at a few points along the Meramec, Gasconade, and Missouri Rivers.

Ohio Basin.—Light overflow occurred near the end of February in many of the Ohio River tributaries particularly in Pennsylvania, West Virginia, Ohio, and Kentucky and moderate flood stages were reached in the Cumberland River Basin from Feb. 19 through March 24. Damage in the Cumberland Basin amounted to about $23,750.

A general rise began in the Ohio River about the middle of February and the river exceeded flood stage at most points by the end of the month. The rise continued into March and developed into the severest flood in the Ohio River since the record flood of 1937. This flood will be covered more fully in a later issue of the REVIEW.

White and Arkansas Basins.—Heavy rains on Feb. 20–21 and again on Feb. 25–27 produced sharp rises in the streams of Arkansas. Rainfall was particularly heavy in west-central Arkansas on the 20th and 21st, with some stations measuring from 3 to more than 4 inches in 24 hours. As indicated by the table at the end of this report, there were at least 2 rises on all the rivers, except on the lower White River where the rise was steady and continued into March. Statistics on flood loss have not yet been compiled.

Red Basin.—Flood stages were exceeded at a number of stations on the tributaries of the Red River and on the main stream at Fulton, Ark., during the last week of February and continued into March.

Lower Mississippi Basin.—The Wolf River at Rossville, Tenn.; Big Lake Outlet at Manila, Ark.; the Tallahatchie River at Swan Lake, Miss.; and the Mississippi River at New Madrid, Mo., reached flood stage during the last few days of February and these rises also continued into March.

West Gulf of Mexico Drainage.—Heavy rains occurred over northeastern Texas during the latter part of February and a major flood prevailed in the streams of this area at the end of the month. Since the flooding extended into March, it will be described more fully in a later report.

Gulf of California Drainage.—A storm during early February produced heavy rainfall over central and northern California. The Fresno and Merced Rivers, Poso Creek, and other small streams overflowed in places, causing minor damage. Kings River overflowed lowlands in the vicinity of Centerville and Sanger with minor damage being caused. As the flood passed downstream it was divided at the diversion dam in the vicinity of Riverdale between Kings River and a channel leading to the San Joaquin River. The flow in the lower Kings River channel was still too great and levees broke in several places, flooding considerable areas of farm lands, some of which remained under water throughout the month.

The most serious damage was caused by the Kaweah River at Visalia and vicinity. The St. Johns River, one of the channels carrying the water of the Kaweah as it reaches the lower levels, overflowed during the night of February 1st, flooding a large portion of Visalia and spreading out over low farms lands in the vicinity.

Light flooding also resulted in the Mokelumne River at Bensons Ferry, Calif., and the Sacramento River at Knights Landing, Calif.

Rains were exceptionally heavy over the Consumnes River foothills. It was reported that Carsen Creek, a tributary to the Consumnes River, was out of its banks and reached the highest stage in the past 30 years.

Columbia Basin.—February was unusually warm and precipitation was above normal in western Oregon. Two periods of heavy warm rains occurred on Feb. 6–7 and 10–12 that melted much of the snow on the ground and produced moderately high crests on the Willamette River tributaries. Some flooding of lowlands occurred, but little damage other than erosion was reported.

FLOOD-STAGE REPORT FOR FEBRUARY 1945

[All dates in February unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest[1]	
		From—	To—	Stage	Date
ST. LAWRENCE DRAINAGE					
Lake Erie					
Sandusky: Upper Sandusky, Ohio	Feet 13	23	23	Feet 13.0	23
ATLANTIC SLOPE DRAINAGE					
Tioughnioga: Whitney Point, N. Y.	12	27	28	13.2	28
Chenango: Greene, N. Y.	8	27	28	8.8	28
West Branch: Renovo, Pa	16	23	23	18.8	23
Susquehanna:					
Oneonta, N. Y.	12	27	28	12.5	28
Bainbridge, N. Y.	12	27	28	13.7	28
Vestal, N. Y.	14	27	28	14.5	28
James: Columbia, Va	10	25	25	10.6	25
Roanoke:					
Weldon, N. C	31	15	15	32.0	15
		24	25	31.7	24
Williamston, N. C	10	18	Mar. 8	11.3	Mar. 1-2
Tar: Greenville, N. C	13	25	[2]		
Neuse:					
Neuse, N. C	14	15	16	14.2	16
		19	21	15.1	20
		23	25	15.7	24
Smithfield, N. C	13	15	27	16.5	25
Goldsboro, N. C	14	23	Mar. 4	16.6	Mar. 2
Cape Fear: Lock No. 2, Elizabethtown, N. C.	20	15	17	23.2	16
		19	28	24.6	20
				26.1	25
PeeDee: Cheraw, S. C	30	24	24	31.6	24
Broad: Blairs, S. C	14	14	14	15.3	14
Santee: Rimini, S. C	12	8	10	12.8	8
		15	[3]	15.0	18
Ocmulgee: Abbeville, Ga	11	27	Mar. 4	11.5	Mar. 2
Altamaha: Charlotte, Ga	12	27	Mar. 8	13.7	Mar. 5
EAST GULF OF MEXICO DRAINAGE					
Apalachicola: Blountstown, Fla	15	20	Mar. 9	19.4	26
Coosa: Gadsden, Ala	20	15	15	20.0	15
Cahaba: Centerville, Ala	23	21	21	23.5	21
Alabama: Millers Ferry, Ala	40	23	27	43.9	25
Black Warrior:					
Lock No. 10, Tuscaloosa, Ala	46	13	16	56.2	14
Lock No. 7, Eutaw, Ala	35	14	Mar. 2	46.6	25

See footnotes at end of table.